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Title:

MANAGING CHANGES IN A RELATIONSHIP MANAGEMENT SYSTEM

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(Richard Zimmermann)

**MANAGING CHANGES IN A
RELATIONSHIP MANAGEMENT SYSTEM**

Cross Reference to Related Applications

[0001] This application is a non-provisional application claiming priority from U.S. Provisional Patent Application Serial No. 60/414,713 entitled a “Managing Changes in a Relationship Management System,” filed September 30, 2002, and incorporated herein by reference in its entirety.

Background

[0002] The present invention relates generally to relationship management systems and, more particularly, to a manner of managing changes made to contact information within a relationship management system.

[0003] Relationship management systems typically use one or more relational databases to, for example, store data or information pertaining to contacts, which may be individual persons, corporations, etc. The information stored in the database for any particular contact may include, for example, phone numbers, facsimile numbers, post office addresses, electronic-mail (e-mail) addresses, etc. and this information may be used to produce mailing lists and customer lists, to send facsimiles, e-mails, or to store contact information to be retrieved at any desired time. One of the simplest and most common uses of a relationship management system is as a centralized electronic address book that can be used by any number of individuals or groups within, for example, a corporation, a law firm, etc. for any number of reasons, such as keeping track of contact information, making sales calls, sending letters, facsimiles, e-mails, etc.

[0004] In the past, there have been two basic paradigms for managing the contact information of different individuals as stored in the database. According to the first paradigm, each user of the database has his or her own contact information stored separately in the database. Thus, if two users of the relationship management system desire to store information about the same person or contact (because both users know this contact), two separate sets of records or data are stored for that contact, even though some or all of the information about the contact, as stored by both users, may be the same. In this type of system, the users may be provided access to some or all of other users’ contact information, with this access being controlled by security

procedures configured by each of the users. However, absent being given the proper clearance, users do not have access or even knowledge of the information stored by other users of the system.

[0005] According to the second paradigm, the relationship management system stores each of the different types of contact information (such as names, post office, street or e-mail addresses, facsimile and phone numbers, company affiliations, titles, etc.) in a database only once and uses folders to provide access to the stored contact information to any number of the users of the relationship management system. Each contact stored within the database may be referenced by any number of folders and each folder typically has access rights that define one or more users of the relationship management system that can access the folder and, thereby, access the contact information associated with the contacts referenced by the folder. There may be different types of folders, such as private or personal folders in which personal contacts, business contacts, etc. are referenced, business folders, group folders set up for specific groups of users, task folders set up for specific tasks, etc. A user having access to a folder may add, change or delete the contact information for any of the contacts referenced by the folder and may add new contacts and associated contact information to the database by adding a new contact to the folder. Each folder may reference more than one contact and each contact may be referenced by more than one folder. Thus, for example, if two users know the same person (a contact), the personal or private folders for each of these users may reference that contact and, thus, each of these users may have access to the contact information associated with that contact, even though the contact information for that contact is stored only once in the database.

[0006] Both of these paradigms, however, have certain problems or inefficiencies when managing changes to be made to the contact information stored in the database. In the first paradigm, a certain user may know of a change in contact information, such as a particular contact moving or getting a new phone number, and update his or her contact information as stored in the database. However, other users which also have contact information stored about that contact may not be aware of the change in the contact information and, as a result, will not know to change their information for the same contact as stored in the database. Thus, in this paradigm, it is difficult to keep all of the contact information accurate because each and every “version” of the

information for a particular contact must be changed manually by the users having access to those different “versions” of the contact information.

[0007] In the second paradigm, any user having a folder which references a particular contact may be able to change the information stored for that particular contact and, thus, when one user becomes aware of a change in contact information and makes the change to the database, all other users immediately have access to that changed information. However, in this case, some users may not want to have access only to the most recently entered contact information as there is no guarantee that the most recently entered contact information is correct. In fact, in some cases, a user making a change to contact information as stored in the database may be wiping out correct information about a contact and replacing it with older or incorrect information. Nonetheless, once changed, this contact information is changed for all users and now none of the users have access to the correct information, even though others of the users, who may have greater knowledge about or a more intimate relationship with the contact, would know that the new information is incorrect. Still further, in some cases, the newly entered information may be temporary only and may, at some point, change back to the way it was stored in the database prior to being changed. This situation may arise, for example, when a contact is going on a sabbatical or making an extended stay at a temporary address, but is eventually returning to the address currently stored in the database for the contact. In this case, some users may only want access to the older or more permanent information because they will not need the new and temporary information.

[0008] In either case, making changes to the contact information may cause certain problems for some users of the relationship management system. These problems may cause users of the relationship management system to doubt its accuracy (e.g., in the case of the second paradigm) because others can change the contact information at will, or to view the relationship management system as less than completely helpful because information about a particular contact, as stored by another user of the system, is not immediately made available to all the users of the system that know that particular contact.

Summary

[0009] A relationship management system stores a different version or file of contact information for a particular contact for each user that knows the contact and stores a firm version or file for that particular contact. To manage changes, the system detects changes made by one user to that user's file for the particular contact and, after filtering or providing oversight of the change, makes the corresponding change to the firm version for the contact. That same change is also made available to the other users who have a file for that contact, which change the other users can choose to have incorporated automatically or semi-automatically (e.g., after review) into their contact files.

[0010] In one embodiment, when changes are made to any of the user contact files for a particular contact, one or more change management routines process the change to determine if a corresponding change should be made to the firm data file for that particular contact. During this process, the change management routines may analyze the change to determine if the change is suspect for some reason and may consult a rules database to determine how to process or manage the change based on the type or nature of change and whether or not the change is determined to be suspect in some manner. During this procedure, the change management routines may automatically make the corresponding change to the contact information within the firm database, may send a notification of the change to a firm database administrator who may review, approve, disapprove or alter the change to be made to the firm database or perform other activities with respect to the change. Still further, when a change is made to the firm database for a particular contact, other change management routines may make corresponding changes to one or more of the contact files within the user databases for that contact so that the change made in one user's private file for a particular contact may be provided to a different user having a file for that same contact in his or her private file. The users may specify or set the manner in which the change management routines make the changes to their private files including, for example, automatically making the change, making the change but notifying the user of the change, notifying the user of the change and allowing the user to opt to have the change made to that user's private database and simply notifying the user of the change. Preferably, each user can control or specify, on a

contact by contact basis, how changes made to the firm data base are handled with respect to the user's private data file.

[0011] This relationship management system allows each user to keep his or her own private data files for each of the contacts known by the user and to personally manage changes made to that private data file, but to have access to the information about those contacts as input by other users of the system. Such functionality provides the user with confidence in the data that is stored in the user's own private or personal data files because that user specifies how and when changes are to be made to those private data files. None-the-less, the user also has access to and is made aware of changes about contacts entered by other users of the relationship management system, which is also very advantageous. Still further, the change management system provides one or more firm administrators with oversight of changes being made to the firm database which provides for more integrity and confidence within that database on the part of all of the users.

Brief Description of the Drawings

[0012] Fig. 1 is a block diagram of an information system network on which a relationship management system may be implemented;

[0013] Fig. 2 is a data flow diagram illustrating data flow between different elements of the relationship management system of Fig. 1;

[0014] Fig. 2A is a data flow diagram illustrating another embodiment of data flow between different elements of an embodiment of the relationship management system of Fig. 1;

[0015] Fig. 2B is a data flow diagram illustrating yet another embodiment of data flow between different elements of an embodiment of the relationship management system of Fig. 1;

[0016] Fig. 2C is a data flow diagram illustrating still another embodiment of data flow between different elements of an embodiment of the relationship management system of Fig. 1;

[0017] Fig. 3 is a further data flow diagram illustrating data flow between user contact collections and a firm contact collection within the relationship management system of Fig. 1;

[0018] Fig. 4 is a block diagram of a set of communicatively interconnected change management routines that operate to perform change management within the relationship management system of Fig. 1;

[0019] Fig. 5 is a screen display illustrating an example display screen that may be provided to a firm administrator by one of the routines of Fig. 4 for use in managing the changes made to the databases of Figs. 2, 2A, 2B, 2C, and 3;

[0020] Fig. 6 is a second screen display illustrating an example display screen that may be provided to a firm administrator by one of the routines of Fig. 4 for use in managing the changes made to the databases of Figs. 2, 2A, 2B, 2C, and 3;

[0021] Fig. 7 is a third screen display illustrating an example display screen that may be provided to a firm administrator by one of the routines of Fig. 4 for use in managing the changes made to the databases of Figs. 2, 2A, 2B, 2C, and 3;

[0022] Fig. 8 is a fourth screen display illustrating an example display screen that may be provided to a firm administrator by one of the routines of Fig. 4 for use in managing the changes made to the databases of Figs. 2, 2A, 2B, 2C, and 3; and

[0023] Fig. 9 is a fifth screen display illustrating an example display screen that may be provided to a firm administrator by one of the routines of Fig. 4 for use in managing the changes made to the databases of Figs. 2, 2A, 2B, 2C, and 3.

Detailed Description

[0024] Referring now to Fig. 1, an information network 10 on which a relationship management system can be implemented is illustrated. The information network 10 includes a number of workstations or user interfaces 12, each having an associated processor 13 and a memory 14, interconnected with a server 16 via a communication link 18 which may be, for example, a local area network (LAN) link of any desired construct or nature. The information network 10 may include any desired number of user interfaces 12 and each of the user interfaces 12 may include any desired type of computer or processor that uses any operating system, such as the Microsoft Windows® operating system, a UNIX operating system, etc. to execute programs or applications. Likewise, the server 16 may be any suitable or desired type of server having a processor 20, a program memory 22 and a relationship database 24. The server 16 may be, for example, a Microsoft SQL database server, an Oracle database

server, etc. While the server 16 is illustrated as being a stand-alone unit, the server 16 could be integrated into one of the user interfaces 12 or into any other suitable processing device, if so desired. Still further, the LAN 18 may be any desired type of LAN connection such as a Microsoft NT or a Novel Netware, or may any other desired type of communication network. While the LAN 18 preferably uses a TCP/IP protocol, any other communication protocol may be used as well to provide communications between the user interfaces 12 and the server 16. Of course, if desired, the communication link 18 could be a wide area network (WAN) instead of a LAN.

[0025] The relationship database 24 stores information about any number of contacts, which may be persons, corporations, organizations or other entities. Generally speaking, the relationship database 24 stores a different user collection for each individual user of the relationship management system as well as a firm collection. Each user collection includes a contact file for each of the contacts known by the user who owns or is associated with that user collection and each contact file within the database 24 may include different contact information fields that store different types of contact information for a contact. The contact information may include, but is not limited to, name information, title and position information, employer information, post office, street and electronic address information, home and business phone number and facsimile number information, professional organization information, how the user knows the contact, etc. Similarly, the firm collection includes a contact file for some or all of the contacts stored in any of the user collections and, generally speaking, the firm collection will include a single contact file for each of the different contacts stored in any of the user collections. Each of the contact files within the firm collection may have the same, greater or fewer information fields as one or more of the corresponding contact files for that contact within the user collections. In one embodiment, the database 24 also stores identification fields that connect or associate the contact files for the same contact within the different user collections with the contact file within the firm collection for that contact. Thus, an identification connection table may store a contact identification (ID) pair, wherein one of the IDs is the ID of a contact file within one of the user collections for a particular contact and the second of the IDs is the ID of the contact file for that same contact within the firm collection. This information can be

used to associate changes made to a contact file within a user collection for a particular contact with changes to be made to the contact file within the firm collection for that particular contact.

[0026] Using the database construct described above, it will be understood that a number of different contact files can be stored for any particular contact. For example, there may be a contact file for a particular contact within each of multiple different user collections (all of whom know the contact in some manner) as well as a firm contact file for that particular contact. Each of these contact files may have the same or slightly different information stored therein depending on what is stored in these contact files by the different users and what, if any, information is released to the firm contact file for that contact by each of the users.

[0027] As illustrated in Fig. 1, the server 16 includes a set of change management routines or applications 26 stored in the program memory 22. The routines 26 may be used to access, store, delete, change and manage the data stored in the database 24, and may include web service access routines, communication routines, synchronization routines, etc. As illustrated for one of the user interfaces 12 in Fig. 1, the relationship management system also includes relationship management routines 30 stored in each of the user interfaces 12. The routines 30 are executed on the processor 13 of the user interfaces 12 and may include a database access routine 31 that communicates with the server 16 to access data within the server 16 using any desired type of communication layer. The database access routine 31, if desired, may use a database driver, such as the Microsoft DB-LIB driver, to perform communications with the database within the server 16. The routines 30 also include a display routine 32 which, as is typical in relationship management systems, creates user interface screens for display on a display screen or other display device associated with the user interface 12 to enable communication with the user via the user interface 12. The routines 31 and 32 operate together to enable a user to enter information, such as contact information related to persons or corporations or other entities to be stored in the database 24, to delete information from the database 24, to access information stored in the database 24, etc. The user may also use the routines 31 and 32 to perform functions using either the contact information stored in the user collection owned by that user or the contact information stored within the firm

collection, such as to send e-mails, facsimiles or regular mail, to create mailing lists, customer lists, etc.

[0028] If desired, one or more of the user interfaces 12 may also or instead store one or more firm administration routines 35 which may be used to monitor and provide data integrity services with respect to the data stored in the database 24. One or more other applications, such as other database access routines may be stored on the user interface 12 and may be used in conjunction with the relationship database 24, such as Microsoft Excel routine, Microsoft Outlook, personal data administrator (PDA) routines etc. Of course, the relationship management system may have many other uses and may include other applications as well.

[0029] Fig. 2 illustrates a logical block of a data flow and manipulation structure that may be used to coordinate changes made within the database 24 to provide more optimal data sharing between users of the relationship management system described herein. As illustrated in Fig. 2, the server 16 includes a user collection database 24a that stores contact files associated with each of the different user collections and a firm collection database 24b that stores contact files associated with the firm collection. User database access routines 31a (which may be executed in, for example, one of the user interfaces 12) access the user collection database 24a via a communication interface 36a, which may be any desired type of communication layer or interface, to provide information to users via one of the user displays 12, to allow a user to access, use and change the contact information stored within the user collections associated with or owned by that user, as well as to change or specify the manner in which contact information within that user's contact collection is to be shared with the firm collection. Likewise, firm database access routines 31b communicate with the firm collection database 24b via a communication interface 36b (which may be the same interface as the communication interface 36a if desired) to allow users to access and use, and in some cases, change, the contact information stored within the firm collection. The firm database access routines 31b may include, for example, mass mailing applications, searching applications, etc.

[0030] During operation of the relationship management system, based on preferences selected by the users, changes made to contact information within the contact files of the user collections within the user collection database 24a may be

sent to and reflected within the firm collection for that contact and, similarly, changes made to contact information within a contact file of the firm collection may be reflected in one or more of the user collections having contact files for that contact. To provide this functionality, one or more change management routines or applications 40 detect changes made to contact information within the user collections of the user collection database 24a and, if such information is to be shared with the firm collection, send that information to the firm collection database 24b for that contact. The change management routines 40 may automatically make the specified change to the firm collection, may provide a message to a firm administrator or gate keeper as to the nature of the change and request approval of the change before making the change to the contact file within the firm collection, or may make the change to the firm collection and notify the firm administrator or gatekeeper of the change. To provide this functionality, the change management routines 40 may send messages to the firm administration applications 35 via a communication interface 36c (which may be the same interface as the interfaces 36a and 36b). In turn, the administration routines 35 may provide messages and other information to the firm administrator via one of the user interfaces 12.

[0031] Furthermore, if desired, a two-way sync application 42 may communicate directly with other standard or known programs, such as Outlook or PDA programs 44 to provide updates made in these programs to the contact information stored within the user collection database 24a. These two-way sync applications 42 are well known and thus will not be described in more detail herein. Generally, however, these two-way sync programs 42 recognize changes made to contact information stored within the other databases, such as an Outlook database, a PDA database, etc. and sync those changes to the contact information within the user collection database 24a for the appropriate user so that, on a user by user basis, the user contact information within the user database 24a reflects the contact information stored in the Outlook, PDA or other file for that user (or vice versa). In this manner, the contact information within the user database 24a can be automatically changed based on changes made by a user in a different program, such as Outlook, PDA programs, etc.

[0032] As will be understood from the diagram of Fig. 2, each of the different users of the relationship management system may have access to and make changes to contact information stored within the user database 24a in a user collection owned by

that user or to which that user otherwise has security access. These changes may be then sent to and reflected in the contact file for that contact stored within the firm collection with the change management routines 40 and the firm administration routines 35 providing a firm administrator the ability to manage and oversee the changes being made to the firm contact information in any number of ways, such as any of those described herein. Likewise, changes made to firm contact information for a particular contact may be sent back to each of the user collections which reference or have a contact file for that particular contact and these changes may be made to the contact information within the different user collections based on preferences specified by the different users. Thus, for example, some users of the relationship management system may allow changes made to the firm contact for a particular contact to be automatically reflected in that user's contact file for that contact while not allowing other changes within the firm contact file to be reflected within that users' contact files without specifically accepting the change.

[0033] Fig. 2A illustrates an alternative embodiment of a logical block of a data flow and manipulation structure that may be used to coordinate changes made within the database 24 to provide more optimal data sharing between users of the relationship management system described herein. As illustrated in Fig. 2A, the user collection database 24a and firm collection database 24b of Fig. 2 may be combined into a single user/firm collection database 25 having user collections 25a and a firm collection 25b. Specifically, the server 16 includes a user/firm collection database 25 that stores contact files associated with each of the different user collections 25a and the firm collection 25b. It will be understood that the user/firm collection database 25 may store each contact files associated with each of the different user and firm collections 25a, 25b, in any known manner, including, for example, separate database tables. User/firm database access routines 33 (which may be executed in, for example, one of the user interfaces 12) access the user/firm collection database 25 via a communication interface 36d, which may be any desired type of communication layer or interface, to provide information to users via one of the user displays 12, to allow a user to access, use and change the contact information stored within the user collections 25a associated with or owned by that user within the user/firm collection database 25. The communication interface 36d may also allow a user to change or specify the manner in which contact information within that user's contact collection

is to be shared with the firm collection 25b stored within the user/firm collection database 25.

[0034] During operation of the relationship management system, based on preferences selected by the users, changes made to contact information within the contact files of the user collections 25a within the user/firm collection database 25 may be sent to and reflected within the firm collection 25b for that contact and, similarly, changes made to contact information within a contact file of the firm collection 25b may be reflected in one or more of the user collections 25a having contact files for that contact. To provide this functionality, one or more change management routines or applications 40 detect changes made to contact information within the user collections 25a of the user/firm collection database 25 and, if such information is to be shared with the firm collection 25b, send that information to the firm collection 25b for that contact. The change management routines 40 may automatically make the specified change to the firm collection 25b, may provide a message to a firm administrator or gate keeper as to the nature of the change and request approval of the change before making the change to the contact file within the firm collection 25b, or may make the change to the firm collection 25b and notify the firm administrator or gatekeeper of the change. To provide this functionality, the change management routines 40 may send messages to the firm administration applications 35 via a communication interface 36c (which may be the same interface as the interface 36d). In turn, the administration routines 35 may provide messages and other information to the firm administrator via one of the user interfaces 12.

[0035] Fig. 2B illustrates another alternative embodiment of a logical block of a data flow and manipulation structure that may be used to coordinate changes made within the database 24 to provide more optimal data sharing between users of the relationship management system described herein. As illustrated in Fig. 2B, the user collection database 24a and firm collection database 24b of Fig. 2 may be eliminated, and a single collection of both user and firm information combined into a single user/firm collection database 25 may be provided, wherein each user may have access to each single contact record. Specifically, in the disclosed embodiment, the server 16 includes a user/firm collection database 25 that stores contact files associated with each of the different system contacts. In other words, the user/firm collection database 25 may store each of the different types of contact information (such as

names, post office address, etc) in the database 25 only once, and each user may access the contact information for any of the contacts for which they have access permission. User/firm database access routines 33 (which may be executed in, for example, one of the user interfaces 12) access the user/firm collection database 25 via a communication interface 36d, which may be any desired type of communication layer or interface, to provide information to users via one of the user displays 12, to allow a user to access, use and change any of the contact information stored within the user/firm collection database 25.

[0036] During operation of the relationship management system, based on preferences selected by the users, changes made to contact information within the contact files of the user/firm collection database 25 may be sent to one or more change management routines or applications 40. The change management routines 40 may automatically make the specified change to the contact file, may provide a message to a firm administrator or gate keeper as to the nature of the change and request approval of the change before making the change to the contact file, or may make the change to the firm collection 25b and notify the firm administrator or gatekeeper of the change. To provide this functionality, the change management routines 40 may send messages to the firm administration applications 35 via a communication interface 36c (which may be the same interface as the interface 36d). In turn, the administration routines 35 may provide messages and other information to the firm administrator via one of the user interfaces 12.

[0037] Fig. 2C illustrates still another alternative embodiment of a logical block of a data flow and manipulation structure that may be used to coordinate changes made within the database 24 to provide more optimal data sharing between users of the relationship management system described herein. As illustrated in Fig. 2C, the server 16 includes a user collection database 24a that stores contact files associated with each of the different user collections and a firm collection database 24b that stores contact files associated with the firm collection. User database access routines 31a (which may be executed in, for example, one of the user interfaces 12) access the user collection database 24a via a communication interface 36a, which may be any desired type of communication layer or interface, to provide information to users via one of the user displays 12, to allow a user to access, use and change the contact information stored within the user collections associated with or owned by that user,

as well as to change or specify the manner in which contact information within that user's contact collection is to be shared with the firm collection. Likewise, firm database access routines 31b communicate with the firm collection database 24b via a communication interface 36b (which may be the same interface as the communication interface 36a if desired) to allow users to access and use, and in some cases, change, the contact information stored within the firm collection. The firm database access routines 31b may include, for example, mass mailing applications, searching applications, etc.

[0038] During operation of the relationship management system, based on preferences selected by the users, changes made to contact information within the contact files of the user collections within the user collection database 24a may be sent to and reflected within the firm collection for that contact. In the described embodiment, to provide this functionality, the user collection database 24a may utilize functionality within the database engine to send that information to the firm collection database 24b for that contact. The firm collection database 24b may then automatically make the specified change to the firm collection, may provide a message to a firm administrator or gate keeper as to the nature of the change and request approval of the change before committing the change to the contact file within the firm collection, or may make the change to the firm collection and notify the firm administrator or gatekeeper of the change to review the change made. To provide this functionality, the firm collection database 24b may send messages directly to the firm administration applications 35 via the communication interface 36c (which may be the same interface as the interfaces 36a and 36b). In turn, the administration routines 35 may provide messages and other information to the firm administrator via one of the user interfaces 12.

[0039] Similarly, changes made to contact information within the contact files of the firm collection within the firm collection database 24b may be sent to and reflected within the user collections for that contact. In this instance, the firm collection database 24b may send that information to the user collection database 24a for that contact. The user collection database 24a may then automatically make the specified change to the user collections, may provide a message to a firm administrator or gate keeper as to the nature of the change and request approval of the change before making the change to the contact file within the user collection, or may

make the change to the user collection and notify the firm administrator or gatekeeper of the change. To provide this functionality, the user collection database 24a may send messages directly to the firm administration applications 35 via the communication interface 36c.

[0040] Referring now to Fig. 3, a set of N user collections 45a, 45b, . . . , 45n is illustrated as being stored in the user collection database 24a. Each of the user collections 45a, 45b, . . . , 45n includes one or more contact files 47 (illustrated in user collection 45a as files 47a-47f). Each of the contact files 47 has different contact fields storing the different contact information for that contact file including, for example, addresses, phone and fax numbers, etc. In Fig. 3, the contact file 47f is expanded to illustrate some of the contact fields associated therewith. It will be understood that each of the different user collections 45 (which are typically owned by or associated with different users) includes any number of contact files 47 and that each contact file 47 may have the same or different contact fields therein. Likewise, different contact files within the different user collections 45a-45n may be associated with the same contact, such as a person, corporation or other entity, and may store the same or in some cases different information about that contact depending on the manner in which the different users who own the user collections have decided to share information.

[0041] As illustrated in Fig. 3, each user collection includes a global change management default setting 50, and each contact file within a user collection includes a couple of specific change management fields 52 and 54 (illustrated as 52a and 54a for the contact file 47a, etc.) The specific change management fields 52 and 54 specify, on a contact by contact basis, what information within the contact file is to be shared with the firm collection and how changes which are made to the associated contact within the firm collection are to be handled or reflected within the contact file for that user collection. In one embodiment, the field 52 may be a visibility flag having one or more bits for each field within the contact file specifying whether that field is to be made visible to the firm collection. If the bit or flag for a specific field is set to be “invisible,” then the information within that field will not be sent to or reflected within the firm contact file for this particular contact owed by this particular user. In this manner, users may keep certain types of information, such a home phone numbers, personal e-mail addresses, or any other desired information, private or

hidden from other users of the relationship management system and yet have access to that information within their own contact file. Likewise, in one embodiment, no changes will be made to these fields based on changes made to the corresponding fields within the firm contact file.

[0042] On the other hand, if the visibility bit or flag for a particular contact information field of a contact file is set to be “visible,” then the information within that field is shared with the contact file for the same contact within the firm collection. As a result, when a user makes changes to the information within this visible field, such as adding information, changing information, etc., the new or changed information is sent to the firm collection for incorporation, if appropriate, into the firm contact file for this contact as stored in the firm collection database 24b. However, this change may or may not actually be made to the appropriate firm contact file depending on the type or nature of filtering being performed by the firm administrator who is overseeing or administrating the firm collection (or appropriate portion thereof).

[0043] The change management field 54 for any particular contact file within the user collections 45 may be a flag or other indication that enables the user to specify the manner in which changes made to the firm contact file for the associated contact are to be treated in the user's collection. While the change management field 54 is illustrated as single flag or value associated with each contact file, if desired, a single change management field 54 may be provided to control the manner in which changes are to be handled for all of the contacts within a user collection, or a separate change management flag or field 54 may be associated with each field of information or any logical group of fields of information within each contact file to enable a user to specify how changes to a corresponding contact file within the firm collection database 24b are to be handled on a more granular basis.

[0044] In any event, the change management field or flag 54 may specify that changes to the contact file within the firm collection be handled in one of many different ways. For example, the flag 54 may specify that a change to a contact file within the firm collection automatically causes that same change to be reflected in the user contact file for that contact (an automatic change with no reporting), that the change be automatically made to the contact file within the user collection and that a

message be sent to the user or owner of that file indicating that a change has been made and, if desired, the nature of that change (automatic change with reporting) or that the change not be automatically made to the contact file within the user collection but that a message be sent to the user or owner of the file indicating that a change has been made to the contact file within the firm collection and the nature of that change (reporting). If desired, such a reporting message may enable a user to opt to have the change made or to opt out of having the change made with a simple reply message. Of course, other manners of dealing with changes may also be used within the relationship management system and it will be understood that appropriate messaging and changing software is incorporated into the suite of change management routines 40 and the administration routines 35 to perform these functions.

[0045] If desired, the generic flag 50 may specify the setting of the fields 52 and 54 for each contact file within a user collection when the contact file is created. Thus, the fields 52 and 54 for a contact file (such as the file 47) may be set as specified by the flag 50 when the file 47 is created. However, the user who owns the collection 45a may change the settings of the fields 52 and 54 for the contact file 47 as desired.

[0046] Referring now to Fig. 4, the change management routines 40 may include a change detection application, routine or subroutine 56 which detects changes made to the contact files within the user collections 45a-45n (of Fig. 3). Upon detecting a change, the routine 56 determines if the visibility flag 52 for the contact information field to which the change was made within the user collection is set to be visible and, thus, is to be shared with the firm collection. If not, the change is not provided to the firm collection. However, if the visibility flag 52 is set to be visible, the routine 56 provides the change to an administration or oversight application, routine or subroutine (called an administration filter 58). The administration filter 58 may provide an appropriate level of processing and filtering on the change, which may include sending a message to the firm collection administrator (via one of the user interfaces 12) to have the administrator approve of the change to the contact file within the firm collection, detecting obvious errors with the change, detecting if the change is suspect in some other manner, etc. In some cases, and possibly based on input from the firm collection administrator, the administration filter 58 may provide the change, or a variation of the change, to a firm change application, routine or subroutine 60 which makes the change to the appropriate contact file within the firm

collection database 24b. Of course, the change routine 60 may use the contact ID table to relate the changes made in a user collection to a contact within the firm collection or may use any other desired method of relating contacts within the user collections to a contact within the firm collection.

[0047] In any event, the same change may also be provided to a user collection change routine 62 which provides the change to one or more of the contact files for that contact within the user collections 45a-45n. The user collection change routine 62 may make or not make the change to each user collection based on, for example, whether a particular user has made the field of the contact file to which the change is to be made visible to the firm collection via the visibility flag 52. When a user collection has a contact file for that contact which has a visibility flag set to be “invisible” for the field of contact information to which the change was made, the user collection change routine 62 may discard or not make the change to that field of information. However, the user collection change routine 62 may send a message to the appropriate user which is accessible via one of the user interfaces 12, to inform the user of the change. On the other hand, when a user collection has a contact file for that contact which has a visibility flag set to be “visible” for the field of contact information to which the change was made, the user collection change routine 62 will use the flag 54 to determine what to do with the change. If the flag 54 is set to automatic change, the user collection change routine 62 changes that contact file for that user collection automatically. If, on the other hand, the flag 54 for that contact file is set to notify the user but not make the change unless the user opts to accept the change, the routine 62 sends a message indicating the change to the user which the user may view via one of the user interfaces 12 and allows the user to respond with an indication to accept or reject the change. If the user responds by accepting the change, the routine 62 makes the change to the appropriate field of the contact file within the user collection for that user. If the user responds by rejecting the change, the change is not made. If the user does not respond, the routine 62 may send periodic reminders, may discard the change after a predetermined time, etc. If, on the other hand, the flag 54 is set to change and report (or notify), the routine 62 changes the appropriate field of the contact file within the user collection and sends a message to the user who owns the user collection that the change was made and the nature of

the change. If desired, this message may allow a user to reverse the change with a response.

[0048] The administration filter 58 may use any desired technique(s) to provide some degree of integrity to the changes being made to the contact information within the firm collection database 24b. In one embodiment, the administration filter 58 may include and execute one or more subroutines that check each change for obvious or apparent errors. For example, these subroutines may determine if an appropriate e-mail address has been placed in the e-mail address field and one that, for example, did not include an “@” symbol or one of, for example, a “.com”, “.gov”, “.org”, etc. suffix would be rejected as obviously incorrect. The routine may also determine if there is a consistent or known match between any or all of the city, state, zip code and country fields of a street address, determine if a phone number has the correct number of digits, a valid area code, etc. Of course, these subroutines may determine or look for any other obvious errors within the change that are inconsistent or suspect within the context of the field in which this information is input or within the context of information within other fields for that contact.

[0049] Still further, the administration filter 58 may include a rule database 64 that stores one or more sets of administrator changeable rules which specify the manner in which changes are to be analyzed and effected. The rule database 64 may be used by an expert engine 66 of any desired type or nature to determine that certain changes are more suspect or more in need of review based on other settings or factors, all of which may be specified by one or more firm administrators who create the rule database 64. For example, a firm administrator may specify that all changes to a certain subset of firm contacts (such as to important firm clients, anyone with a certain title, etc.) be reviewed by the administrator before being changed. Likewise, all changes made by a particular user may be flagged as being suspect based on known habits of that user to be less careful with the changes he or she makes in the user collections owned by that user, based on the length of time that the user has been with the firm, etc.

[0050] In any case, if a change passes as appropriate and is not otherwise suspect, the administration filter 58 may make the change automatically to the related contact file within the firm collection without notifying the administrator, may make the change and notify the administrator of the change and the nature of the change

(thereby giving the administrator the opportunity to review the change) or may simply notify the administrator of the change and allow the administrator to review the change and opt to accept or reject the change to the firm collection via messaging on one of the user interfaces 12. Of course, these settings may be different for different types of detected errors or other properties of the change and may be specified by the rule database 64. Similarly, if an obvious or suspected error is detected, or the change is flagged by the expert application 66 for some other reason, the change may be provided to the administrator for review and for acceptance or rejection. As will be understood, the operation of the administration filter 58 and the types and numbers of messages that that routine sends to the administrator is dependent on the configuration of the rule database 64 which may be determined by the firm administrator. Thus, the firm administrator may configure the rule database 64 to pass all changes, to notify the administrator of some or all changes so that the administrator has the opportunity to accept or reject each change to the firm collection, to make changes to certain contacts and allow the administrator to review changes to other contacts, etc. Of course, these settings depend on the type, size and nature of the organization, the number of administrators that may be present within the organization, the uses to which the relational database is put, etc.

[0051] A more detailed description of one embodiment of the administration routine 35 and administration filter 58 will now be described. First of all, it will be understood that the administration routine 35 may be initially used to create relationship management tables within the database 16 to thereby organize the data therein in any desired or useful manner. In one embodiment, the tables or contacts, collections, etc. within the database 24 may be created as objects within an object oriented programming environment. In any event, one of the user interfaces 12 may store and execute a system administrator application or program that installs or sets up the tables and fields within the database 24 for the collections, contacts and contact information, as well as any other desired tables and fields used in any manner by the relationship management system. Once the database 24 is set up or created, each of the routines 31 and 35 can access the appropriate tables and fields in the database 24 as described above to add, delete, view and use the collections, contacts and contact information stored in the database 24. If desired, a list of contacts is stored in one table in the database 24 along with a unique identifier or contact ID for each contact,

while the list of collections and a unique folder ID for each collection is stored in a separate table. Still further, a table may store unique user IDs for each user of the relationship management system. Different types of contact information is stored in still different tables and, generally speaking, a different table exists for each different type or category of contact information, such as addresses, phone numbers, etc. Of course, each contact information table may have different attributes for each piece or type of contact information. Thus, a table that stores street or post office address information may have different fields or attributes including, for example, a number of fields for a street or post office designation, a field for a city designation, a field for a state designation, a field for a zip code designation, etc., while a table that stores electronic address information may have a field for an e-mail address and a field for a web site address.

[0052] Also, generally speaking, when a user wants to add a new contact to the database 24, the database access routine 31 may search the contact table for a collection owned by that user or by the firm collection to determine if a contact having that name or a similar name already exists within the database 24. A set of similar contacts may be displayed to the user and the user may be asked if any of the already existing contacts is the same contact as the new contact being entered. If not, then the new contact is stored in the contact table and is given a unique contact ID and, thereafter, contact information may be stored for this new contact in the contact information tables by referencing the contact ID associated with this new contact. Similarly, the routine 35 or one of the routines 40 may determine if the firm collection potentially includes a contact file for that contact and, if not, may add that contact to the firm collection (assuming that some of the information for that contact is visible to the firm collection). In this process, the routines 40 and 35 may send one or more messages to the firm administrator(s) asking if the new contact entered by the user is the same as one or more other similar contacts within the firm collection to prevent two different contact files from being created for the same contact within the firm collection. In any case, the contact IDs for the firm collection and the user collection for a particular contact are linked in, for example, an ID linking table, such as that discussed above.

[0053] During the change management process, which is initiated by additions, changes or deletions to the database 24, the administration filter 58 may process the

changes and may apply one or more rules as stored within the rule database 64 to the changes to determine one or more event actions to be taken. An event action may be, for example, to make the change to the firm collection, to provide the change to one or more data administrators for review, notification, acceptance, etc., to send a follow-up message to the user making the change, addition or deletion, etc. Upon determining an event action, the administration routine 58 may create a ticket and provide that ticket via an inbox to the appropriate administrator for processing.

[0054] If desired, more than one data administrator may specify rules to be applied to the change and, thus, more than one set of rules may be used to analyze any particular change. Generally speaking, the change management rules within the rule database 64 provide a level of control over additions, modifications, or deletions made to firm contacts. The imposed rules dictate how a captured change will be evaluated and processed prior to entering a review change process in a data quality inbox of an administrator. Of course, different rule sets may be selected or used based on different properties of the changes, such as the contact on which the change is made (which may be, for example, a highly managed contact, a moderately managed contact, an unmanaged contact, etc. having different levels of management and review), the user making the change, the type of change being made, etc.

[0055] Thus, for example, when a change is detected, the change may be categorized as one of an add, edit, delete, format change, and suspect change based on processing performed on the change. The add, edit and delete classifications are self-explanatory. A format change classification signifies that the data has been altered, but the actual value has not. Generally speaking, a format change may be detected by comparison logic that normalizes both the changed and the unchanged values before being compared. In one example, the comparison logic may remove all punctuation, remove all extra spaces, convert to upper case for case insensitive comparisons and expand abbreviations (in addresses for example). If, after this normalization process, the before and after values are equal, the change is simply a format change. A suspect change indicates incomplete data or the misuse of a field and is identified when data items that have associated validation rules are evaluated and the change made to the data does not pass the validation test(s). Examples of this type of change include an address with only a city value, an address that does not pass state/country validation, a

phone number with less than seven digits, etc. Of course many other types of suspect changes may be detected.

[0056] After being categorized with respect to a change type, rule sets as stored in the rule database 64 may be used to analyze a change and determine one or more event actions for that change. Rule sets may include rules that function on one or a combination of change types, contact types, user or user types, external system changes, “values” for specific actions, etc. Change types are described above. Contact types define the type of contact to which the change is made and may include, for example, experts, clients, users, employees, professors, corporations, or any other designation defining a type of contact. Processing on contact types enables consistent processing behavior for contacts of a specific classification or profile. The user type defines properties of particular users of the system who are making the change and may specify some generic property of the user, such as the access the user has, the role the user performs in the firm, the age, tenure, etc. of the user or any other property of the user. Processing on user types enables special behavior based on who is making the change, which allows an administrator to more closely monitor changes made by very inexperienced, disgruntled or notoriously “bad” users. The external system type may define the type or nature of an external system from which the change is made, such as a different database (like Outlook or a PDA). With this type, rule collections for an external system may be created to manage changes made to, for example, the employee contact type. The external system type enables special processing behavior based on the specific external system that owns the data and provides the capability for an administrator to provide a submission process for data that is maintained in another system, such as a Outlook, etc. Rules or rule sets based on this type help assure that ambiguous changes made in other systems are recognized and analyzed to prevent or detect ambiguities or other problems arising from the manner in which the external system stores or recognizes the data.

[0057] Because rule sets can be defined in multiple contexts, multiple rule sets may be applicable for any given change event. For example, a contact could have five different contact type classifications, with each contact type having a different rule set applied thereto. Still further, if more than one rule set is applicable for a given change event, then it is desirable to provide an ordering of the rule sets to ascertain which rule set to use to determine the event action and the processing order of the rule sets to

locate the most restrictive event action setting. If more than one rule set applies for a given change event, then all the rule sets may be analyzed to locate the rule set with the most restrictive event action value. Likewise, if more than one rule set is found to have the most restrictive event action, then the highest-ranking rule set may be used to process the event change.

[0058] Generally speaking, a rule collection is a set or a compilation of rules that apply to various fields of contact files. For example, when an administrator is creating a new rule collection, the Accept rule may be applied to all fields within the rule collection by default. The administrator can then name the rule collection and apply different rules to different fields for the contact. At this time, the rule collection could be applied to a new rule set.

[0059] As will be understood, the primary role of the rules engine or expert engine 66 is to respond to detected changes and to provide the appropriate event action for a given change event. The rules engine 66 evaluates a change event by first determining the rule sets that are applicable for a particular change event, based on certain factors such as contact type, user who made the change, etc. Then the rule engine 66 orders the rule sets in the case in which more than one rule set is applicable. The engine 66 may then iterate through the applicable rule sets to locate the most restrictive action and, if more than one rule set is applicable, select a primary rule set by finding the highest ranking rule set with the most restrictive action value. The primary rule set is used to determine the owner (e.g., the specific administrator if more than one administrator oversees changes) and the action value of the change event. Secondary rule sets are used to determine the secondary owners or administrators for notification purposes. The rules engine 66 may then determine the event action value for both the primary and secondary rule sets.

[0060] The rules engine 66 also provides an interface to be called from a windows client administrator. The configuration and management of the rule sets, rule collections and rules are preferably performed in the administration routines 35. When changes are made to any of the rule components, the rules engine 66 may be notified in order for it to properly update its data cache.

[0061] In response to a change, an event action, as determined by the rules engine 66 based on the primary and possibly secondary rule sets, occurs to process the

change, with the event action being, for example, one of the accept, review, submit and notify (follow-up) actions. These event actions may be represented in a data quality inbox for an administrator as a status associated with a ticket item. Generally speaking, the accept action indicates that the data owner (or administrator in this case) does not want to monitor the change made and the system processes the change using normal business rules logic. Because sites may get overwhelmed with reviewing tickets, the accept event action may be associated by default with a majority of the change events in the system. The review action indicates that the data owner (e.g., the administrator) wants to review or monitor the change. When the review action is used, the system processes the change using normal business rules logic and the administrator is notified of the change via the data quality inbox. The submit action indicates that the data owner (e.g., administrator) wants to approve of the change. In response to a submit action, the system does not process the change until the administrator specifically approves of it. Preferably, the administrator is notified of the submit requests via a data quality inbox.

[0062] The notify (follow-up) action is an additional setting that applies to action values of review or submit, whereby the system is instructed to notify the administrator in the special circumstance where the rule set loses out to another rule set. Situations in which this would occur may include when a higher ranking rule set applies and has the same action value for the change event, a lower ranking rule set applies and has a more restrictive action value for the change event., the rule set is associated to a data type and the data item that has changed is owned by an external system with the external system rules ranking higher than contact type rules, etc. The notify action provides a means by which a rule set owner can always be notified of change events even though the rule set may not be the primary rule set selected for the change event.

[0063] Referring now to Fig. 5, an example screen display that may be provided to a data administrator via one of the user interfaces 12 is used to specify follow-up text for the administrator or a user to suggest some additional processing that should take place as a direct result of the processing of a specific change event. This additional processing may ensure the firm listing is updated in accordance to firm policies and procedures. As illustrated in Fig. 5, follow up text, which may be provided to the data administrator via text messages within a change action ticket, may be specified

according to any combination of change category (such as an change type, contact type, user request, etc.), an item, which may be a change to a specific field, such as an address field, a change to a particular type of contact, such as a client, and an action type, such as an add, delete, format, etc. action type, etc. The follow-up text may be specified in a text field and this follow-up text or message may be given a priority to enable the rules engine 66 to accord a priority to this follow-up text message when other rules apply as well.

[0064] Fig. 6 illustrates an example screen display of a data administrator inbox that may be provided to an administrator to provide the administrator with the set of tickets generated by or as a result of change actions which have occurred. As illustrated in Fig. 6, a first screen section 70 provides a summary of the pending tickets, with this summary having a ticket number, a contact to which the change occurred, a summary of the change or a brief description of the change, a user who made the change, the date the change was detected, the rule set that was applied to the change, a category of the change, an administer to whom the change belongs and a status of the event action or ticket (e.g., what action the administrator has taken, if any). Of course, other information could be supplied in addition or instead.

[0065] A second, detailed information section 72 provides more details pertaining to a highlighted one of the tickets. In this example, ticket number one indicates that Terry Hamer made an edit to the address field of the contact Bob Nagy. The administrator can accept or reject the change by selecting the approve or reject buttons 74 and 76 or can get follow-up instructions from the follow-up text by selecting the follow-up button 78. If the administrator accepts the change, the change is made to the firm contact within the firm collection and may also be reflected back in other user collections besides the user collection of Terry Hamer wherein this change was made in the first place. The purpose of the screen of Fig. 6 is to view tickets which are generated by the rule engine and submitted to the data manager inbox for completion.

[0066] As will be understood, a predetermined rule set criteria associated with a particular contact (which may be different if the contact is highly managed, moderately managed and unmanaged) is applied when a user adds, modifies, or deletes information associated to a contact and a ticket #, category, and status is then

assigned to the change. This ticket is then sent to the administrator. The inbox of Fig. 6 is, essentially, a listing of all tickets that have been routed through the system to the administrator for review and/or completion.

[0067] When displayed in the inbox and, in particular, the summary section 70, the tickets may be sorted in any desired or applicable manner, such as by status, date, and contact, order of importance, ticket number, etc. The ranking of status may be as submitted, reviewed, outdated, notify and completed. Generally speaking, the purpose of the ticket groupings is to identify the most critical tickets, e.g., the tickets that are awaiting acceptance or that have been in the system for a particular period of time. Of course, the administrator can sort the columns individually, in which case the original sort order will no longer display for the current session. If more than a particular or preset number of tickets that require completion are to be displayed, an alert may be presented to indicate that the inbox needs to be filtered.

[0068] Referring now to Fig. 7, an example screen display illustrating a ticket (number 4) that has been identified to have a suspect change type is illustrated. Here, the field 72 illustrates that the first name of the contact was completely deleted, which is suspect. Generally speaking, a suspect change indicates to the data steward or administrator that the monitored contact information contains incomplete data or that a field has been misused. For example, a user may have entered an e-mail address in the phone number field. Typically, the administration filter 58 (Fig. 4) will perform validation checks of information on a field-by-field basis. If information contained in a field does not pass validation, then the filter 58 generates a ticket with the suspect change type.

[0069] If desired, an alert indicating the suspect description may be displayed and a summary for a suspect edit may be provided as a combination of the field name plus the suspect value change type name. For example, if a ticket was generated because a contact's first name was deleted, the summary would be "First Name – Suspect Value".

[0070] A suspect description may be displayed in an alert box, for example, above the summary line. As illustrated in Fig. 7, the suspect description may contain a brief explanation why the associated ticket line item is a suspect change. For instance, if only six out of the seven numbers associated with a phone number were entered, the

summary text may be “Phone Number – Suspect Value” and the description in the alert box would indicate “incomplete data.” When the status of the ticket becomes “Completed,” the alert box may contain the “Completed” ticket text and the description of the suspect change may be appended to the summary text in the ticket review or summary section 70. For example, if the first name of a contact was deleted, the description in the alert box when the ticket is open might be “Incomplete Data: First Name [Deleted]” and the summary text might be “First Name – Suspect Value.” However, once the ticket is completed, the alert box may state “Completed ticket. Maia Tihista approved the ticket on 12/10/2001.” The summary text may also now contain the description of the suspect change, which in this case would be “First Name – Suspect Value, Incomplete Data: First Name [Deleted].”

[0071] The following is an example list of the suspect summary text along with the associated suspect descriptions that may be displayed in the alert box above the summary label, and when the ticket is completed, may be appended to the summary text below the alert box:

Suspect Summary Text	Description Appended to Summary Text
First Name – Suspect Value	No First Name Value
First and Last Name – Suspect Value	The first name also changed when the last name changed.
Address – Suspect Value	<ul style="list-style-type: none">- The address is incomplete.- The address contains state and country values that are considered an invalid combination.
Phone Number – Suspect Value	<ul style="list-style-type: none">- The phone number does not contain at least 7 digits.- The phone number contains invalid characters.
E-mail Address – Suspect Value	The e-mail address may be invalid because it does not contain an ‘@’ symbol.

[0072] Referring now to Fig. 8, an example screen display that may be associated with a ticket which indicates that that a potential duplicate contact has been added to the database which may be detected by the administration filter 58 of Fig. 4. In this case, the detailed information section 72 provides the administrator with a list of potential contacts within the firm collection that may match or be a duplicate of the newly added contact within one of the user collections. The purpose of the processing within the filter 58 is to avoid contact duplicates and the duplicate contact categorization provided by this screen denotes the newly added contact needs to be checked against one or more existing contacts in the system. The radio buttons in the first column of the detailed information section 72 allow the data steward or administrator to select that there are no contacts in the list that match the selected contact or that the contact associated with the ticket is a duplicate of a listed one of the contacts existing in the system. When the administrator selects the “No Match in List” radio button, the Merge button 80 will change to an OK button and will become enabled. On the other hand, when one of the radio buttons associated with a contact in the list is selected, the Merge button 80 will become enabled. Upon selecting the Merge button 80, a merge operation is performed which merges the new contact with the selected, existing contact. The administrator may be called upon to select between different data for the same fields within the merged contact when the same field for the existing and new contact have different information therein. Upon merging the duplicates, the resolution displayed in the Ticket History tab of the Ticket Details window may indicate that the duplicate has been merged. Of course, the data administrator may select the Follow-up button 82 to have access to further processing steps which are suggested to be performed and may get more contact details by selecting the Contact Details button 84.

[0073] Fig. 9 illustrates an example screen display that may be presented to the administrator to provide the administrator information about a user request type change. The purpose of the user request category or change type is to indicate to the administrator that a user has entered a description of a request or notification via the correction request screen in, for example, a Web Client or Windows Client. For instance, if a company went out of business and a user was not sure what to do with that information and/or how to update the information in the system, the user could enter the information in the description area of the correction request screen and

submit the request as a user request which would be detected as such and presented to the proper data administrator. The data administrator could then review the request and make the necessary modifications to complete the request.

[0074] Of course, many other types of categories of changes and manners of dealing with changes on the part of the data administrator can be provided as well, with the goal being to provide an appropriate level of oversight of changes to the firm collection without overwhelming an administrator. The processing and oversight of changes enables the user of the relationship management system to have confidence in the data coming from the firm collection and thus confidence in the data that is potentially being reflected within that user's collection(s). However, this system also provides the user with the ability to control what changes are made and how changes are made to his or her own contact data based on the manner in which the users set the visibility and change flags within his or her collections.

[0075] Although the routines described herein, including the change management routines 40, are preferably implemented in software stored in, for example, a memory of a user workstation or user interface or a server, these routines may alternatively or additionally be implemented in hardware, firmware, etc., as desired. If implemented in software, the routines may be stored in any computer readable memory such as on a magnetic disk, a laser disk, an optical disk or other storage medium, in a RAM or ROM of a computer, user interface, workstation or other processing device. Likewise, this software may be delivered to a user or to a processing device via any known or desired delivery method including, for example, over a communication channel such as a telephone line, the Internet, etc.

[0076] While the present invention has been described with reference to specific examples, which are intended to be illustrative only and not to be limiting of the invention, it will be apparent to those of ordinary skill in the art that changes, additions or deletions may be made to the disclosed embodiments without departing from the spirit and scope of the invention.